



REMARKS

This request for reconsideration is filed in response to the Office Action dated October 24, 2006. In view of these remarks and the declarations of inventors Hidenobu Yaku and Tetsuo Yukimasa this application should be allowed and the case passed to issue.

Claims 1, 2, and 4-10 are pending in this application. Claims 1, 2, and 4-10 have been rejected. Claim 3 was previously canceled.

*Interview Summary*

Applicants gratefully acknowledge the courtesy of Examiners Pande and Strzelecka in granting a personal interview with the undersigned on October 12, 2006. During the interview, the undersigned asserted that the Amendment of June 20, 2006 clearly placed the application in condition for allowance in view of the evidence of unexpected results from the experiments of Mr. Yukimasa. The undersigned further explained that the limitation, "inorganic phosphoric acid is detected within 100 seconds" was supported in the specification by the Examples and Figs. 6 and 10. As regards Mr. Yukimasa's data, Examiner Strzelecka opined that a declaration would be helpful, but further consideration was required. Examiner Strzelecka further suggested that an additional test would be helpful, such as a sample comprising diaphorase, but without the mediator. Because the June 20, 2006 preliminary amendment was filed on the same day as an Office Action was mailed, the Examiners informed us that they would probably issue a new Office Action addressing the June 20, 2006 Amendment. On October 17, 2006, Examiner Pande called and informed the undersigned that a new Office Action will be issued.

***Priority Under 35 U.S.C. § 119***

While the Examiner acknowledged the claim for foreign priority on the PTOL-326 form, the Examiner did not acknowledge receipt of the priority document. It is requested that the Examiner acknowledge receipt of the priority document in the next official action.

***Claim Rejections Under 35 U.S.C. § 103***

Claims 1, 2, and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Scopes (Analytical Biochemistry 49, pages 88-94) in view of Imamura et al. (JP 2000-189188) and Alvarez-Gonzalez et al. (Anal. Chem., Vol. 72, pages 520-527), as evidenced by Carlier (Biochem. and Biophys. Res. Comm. Vol. 143 (3), pages 1069-1075) and Gorton et al. (Reviews in Molecular Biotechnology, Vol. 82, pages 371-392). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention, as claimed, and the cited prior art.

An aspect of the invention, per claim 1, is a method of detecting an inorganic phosphoric acid which comprises subjecting a sample to a measurement system including glyceraldehyde-3-phosphate, oxidized nicotinamide adenine dinucleotide or oxidized nicotinamide adenine dinucleotide phosphate, glyceraldehyde phosphate dehydrogenase, diaphorase, and an electron mediator. A current value in the measurement system is measured, wherein the current value indicates the concentration of the inorganic phosphoric acid in the sample. The inorganic phosphoric acid is detected within 100 seconds after subjecting the sample to the measurement system.

The Examiner asserted that Scopes describes a method for detecting an inorganic phosphoric acid using a spectrophotometry. The Examiner acknowledged that Scopes does not teach the use of diaphorase and an electron mediator, and measuring the current value. The

Examiner relied on Imamura et al. for teaching the use of electron mediators, diaphorase, and measuring current. The Examiner opined that it would have been obvious to combine the processes of Imamura et al. and Scopes in order to eliminate the use of a bulky spectrophotometer and because measuring electrical current provided rapid detection of NADH. The Examiner further relied on Alvarez-Gonzalez to show that NADH could be detected within 100 seconds. Furthermore, the Examiner alleged that Carlier taught that the glyceraldehyde-3-phosphate and glyceraldehyde phosphate dehydrogenase system was more efficient than the Alvarez-Gonzalez system because spectrophotometric detection could be made within 10 seconds. The Examiner further alleged that Gorton et al. provides motivation for rapid detection.

The combination of the cited references does not suggest the claimed method of detecting an inorganic phosphoric acid. It would not have been obvious to combine Imamura et al., Alvarez-Gonzalez et al., Carlier, and Gorton et al. with Scopes to achieve the claimed method. Imamura et al. and Alvarez-Gonzalez are not directed to detecting an inorganic phosphoric acid in a system comprising glyceraldehyde-3-phosphate and glyceraldehyde phosphate dehydrogenase. Carlier et al. is directed to fluorescence measurement, not current measurement, and Gorton et al. disclose that a rapid reaction is desirable but do not disclose the claimed method of obtaining a rapid measurement. Further, the combination of references do not suggest the claimed method because  $\Delta G$  for the reaction disclosed by Scopes is positive and the prior art does not suggest shifting the positive  $\Delta G$  to negative values, thus greatly increasing the speed of the reaction according to the claimed process.

The claimed method is further distinguishable over the cited references in view of the evidence of unexpected results in the specification showing detection of the inorganic phosphoric acid within 100 seconds. Even if Scopes and Imamura et al. were combined, as asserted by the

Examiner, the combined teachings would not suggest detecting phosphoric acid within 100 seconds. As disclosed in the Examples of Imamura et al. (page 19) the current was measured for 5 minutes (300 seconds).

In response to Examiner Strzelecka's request during the personal interview of October 12, 2006, further evidence of the unexpected results provided by the claimed method is found in the Declarations under 37 C.F.R. § 1.132 of Hidenobu Yaku and Tetsuo Yukimasa, filed concurrently with this response. The Yaku declaration shows the data obtained from Sample 4 and was prepared in response to the Examiner's request of data from a sample prepared in the same manner as Sample 3 comprising diaphorase, but without the mediator.

In the Yukimasa declaration, Sample 1 does not contain the claimed electron mediator and diaphorase. Sample 2 contains the claimed electron mediator but does not contain diaphorase. Sample 3 contains both the claimed electron mediator and diaphorase. As shown in Table 3, Sample 3 containing both diaphorase and the electron mediator has a phosphoric acid reaction change rate 342 times greater than Sample 1. The relative reaction change rates were determined by setting the reaction change rate of Sample 1 to 1.

In the Yaku declaration, Sample 4 contains the claimed diaphorase but does not contain the electronic mediator. The Sample 4 data was about the same as Sample 1 (without diaphorase and the electronic mediator mediator). Comparing Samples 1, 2 and 4 (unfavorable data) with Sample 3 (favorable data), it is clear that the use of both the claimed diaphorase and electronic mediator produces a synergistic effect not suggested by the cited prior art. It is clear that diaphorase alone without the electron mediator (Sample 4) or the electron mediator alone without diaphorase (Sample 2) does not efficiently drive the reaction.

Claims 5 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Scopes in view of Imamura et al. and Alvarez-Gonzalez et al., as evidenced by Carlier and Gorton et al. and further in view of Baykov et al. (Analytical Biochemistry 119) and Baykov et al. (Analytical Biochemistry 116). The Examiner relied on the Baykov et al. references for the teaching of converting a pyrophosphate into an organic acid.

Claims 7-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nyren (U.S. Pat. No. 6,258,568), as evidenced by Baykov et al. (Analytical Biochemistry 119) and Baykov et al. (Analytical Biochemistry 116), Scopes, Imamura et al., Alvarez-Gonzalez et al., as evidenced by Carlier and Gorton et al. The Examiner relied on Nyren for the teaching of a method of detecting a nucleic acid.

These rejections are traversed, and reconsideration and withdrawal respectfully requested. Nyren and the Baykov et al. references do not cure the deficiencies of Scopes, Imamura et al., Alvarez-Gonzalez et al., Carlier, and Gorton et al. and do not suggest the unexpected results of the claimed invention, as explained above.

The dependent claims are allowable for at least the same reasons as the respective independent claims from which they depend and further distinguish the claimed methods.

In view of the above remarks and the Yaku and Yukimasa declarations, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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